

DISEASE PREVALENCE AND CURRENT FUNGICIDE USAGE PATTERN IN CHILLY CROP IN TELANGANA AND ANDHRA PRADESH

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ABSTRACT

The study was carried out for the current fungicide usage pattern in Chilly crop in Andhra Pradesh and Telangana. For the study leading districts in Chilly production were identified, Guntur and Kurnool in Andhra Pradesh and Khammam, Warangal and Mahaboobnagar in Telangana. Area wise growing pattern of Chilly was studied which shows that 64% farmers grows Chilly through nursery and 61% farmers use hybrids for Chilly production. Most of Farmers (60%) who grow hybrid Chilly use herbicides and farmers who grow local varieties do not use hybrid because it was found that use of hybrids reduces plant growth in case of local varieties. In study area wise disease severity was seen and it was found that due to varied climatic conditions and difference in sowing time disease severity varies. Cercospora leaf spots and Anthracnose/die back is having high severity in almost all chilly growing areas. Area wise farmers' expenditure and number of sprays per acre per season also varies. In Guntur, Adoni (Kurnool) farmers are spending Rs. 12,000/- to Rs. 15, 000/- on fungicides and they are doing 15-20 sprays per acre per season. In areas like Mahabubabad (Warangal), Mahabubnagar, Ranga Reddy and Macherla (Guntur) farmers do less expenditure (Rs. 8, 000-Rs. 10,000) on fungicides and number of sprays is also 10-12 in these areas. With the help of this study we could be able to suggest farmers about controlling severe disease as it occurs in their area and methodology required to use proper fungicides to control these diseases.

KEYWORDS: Chilly Crop, Fungicides, Cercospora Leaf spots & Anthracnose

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INTRODUCTION

World chilly production is primarily concentrated in South Asian countries to an extent of about 55% of total world production. India is the single largest producer contributing about 38%, followed by the neighbours i.e., China with 7%, Pakistan and Bangladesh contribute about 5% each, while the rest of the output is spread across South American and African countries. Further, India is the largest exporter of chilly, meeting nearly half of the world's consumption demand. Its production level hovers more than 1.5 million tons annually. Apart from India, China also exports to an extent of about 19% of total world's exports. Peru contributes to nearly 9%, while Spain is the fourth largest exporter in the world. (As per the FAO data) The production of Dry Chilly in India is dominated by Andhra Pradesh and Telangana which bestows 47% and 18% of the total production (as per Ministry of Agriculture & Farmers Welfare (ON1601 year 2016-17). Madhya Pradesh has now come out as the third largest producer of Chilly with a contribution 7% in production followed by Karnataka and West Bengal with a contribution of approximately 6% (as per Ministry of Agriculture & Farmers Welfare (ON1601 year 2016-17). Andhra Pradesh and Telangana are major Chilly producing states in India; the major Chilly growing districts in

these states are Guntur, Warangal, Krishna, Khammam, Prakasham, Pundur, Cuddpah, Rajamundry and Nellore in Andhra Pradesh and Warangal, Khammam, Nizamabad, Ranga Reddy in Telangana. Guntur district in Andhra Pradesh alone contributes to over 35 percent in area under chilly crop in India. Guntur is the biggest Chilly market in Asia is contributing 30-50% of the total production of Andhra Pradesh. Area and Production of Chilly in this area decides prices. The varieties of chilli produced by India are Sannam, LC 334, Byadgi, Wonder Hot, Jwala etc.

Fungicides are used to control disease attacks on crops. The growing horticulture market in India owing to the government support has given a boost to fungicide usage. The market share of fungicides is also from 16%-20%. Fungal disease for man important part of the entire plant diseases in India and hence fungicides are highly important in controlling fungal diseases. The classical Bengal famine of rice by an epidemic of brown spot disease *Cochliobolus miyabeanus* reveals the importance of fungicides in India. It is further augmented by Irish famine of 1741 caused by early leaf blight of potato. The major crops, consuming fungicides are: rice and potato on grounds of serious diseases as Rice blast in rice and early and late leaf blight in potato. Grape's downy and powdery mildew attracts a chunk of fungicides for remedy, vegetables also attract a lot of fungicides as anthracnose in Chillies, mildew diseases etc. Longer-term, farmers are looking at fungicides to drive quality and yield. While the segment has been somewhat marginalized in the past, the more educated growers become, the more they realize the benefit fungicides can have on the production. What we've seen emerging is a growing segment, growing fairly rapidly, looking to maximize their yield profitably and have high-quality crops.

The graph (Figure 1) shows that maximum amount of fungicides is consumed in Rice and in case of vegetables Potato and Chilly are the main crops for consumption of fungicides. The graph (Figure 2) shows that Andhra Pradesh is having maximum consumption of fungicides and in Andhra Pradesh is leading in production of Chilly also.

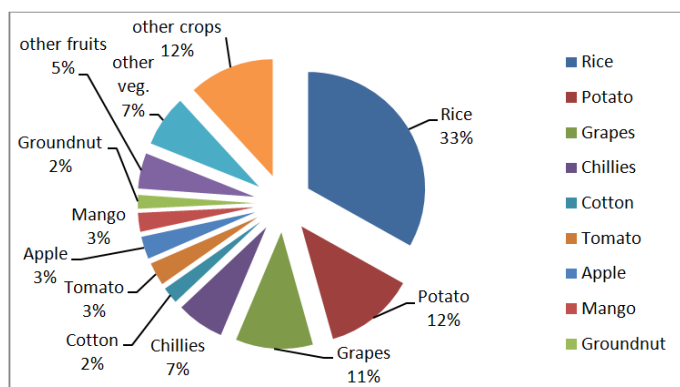


Figure 1: Crop Wise Share of Fungicide Consumption

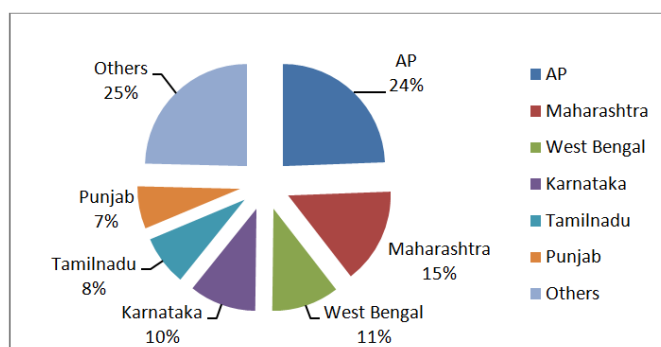


Figure 2: State Wise Share of Fungicide Consumption

Study Area

The study areas were different districts of Andhra Pradesh and Telangana. Districts which are having good potential of Chilly growing and which are the major contributing districts to the production of Chilly, were selected for the study. In case of Chilly it is having good amount of fungicide consumption in vegetables after potato.

The districts selected for the study are given in the table below (as per an average proceeding of 5 years from 2014-15 for Telangana and 2016-17 for Andhra Pradesh)

Table 1: Area, Production and Productivity under Chilly of Districts selected for Study Purpose

S. No.	Districts	Area in ha.	Production in Tonnes	Yield in Kg./ha.
1	Guntur	66,436	-	-
2	Kurnool	16,121	-	-
3	Warangal	24,348	78185	3211
4	Khammam	29,606	120068	4056
5	Mahboobnagar	8,391	25190	3002
6	Ranga Reddy	1,028	3271	3182

Source: (Directorate of Economics and Statistics, Planning Department, Govt. Of Telangana, Hyderabad; Directorate of Economics and Statistics, Government of Andhra Pradesh)

From these selected districts, markets having a good potential for fungicides used in Chilly, were selected. From Guntur district Guntur and Macherla, Khammam, from Warangal district Mahabubabad and Warangal, from Ranga Reddy, Parigi, Puduru, from Kurnool Adoni and from Mahabubnagar Gadwal market are selected for study purpose.

METHODOLOGY

For the study both primary and secondary data were collected for the study. The primary data were collected from farmers and dealers of selected areas of Andhra Pradesh. The methodology for the collection of primary data involved interview schedules through separate pre-structured questionnaires for farmers and dealers/retailers containing both open-ended as well as close-ended questions. The secondary data were collected from different magazines and booklets of university (Acharya N. G. Ranga Agricultural University, Guntur (AP) and Professor Jayashankar Telangana State Agricultural University, Hyderabad (Telangana) and journals of department of agriculture, department of statistics and web portals of companies. Both exploratory and descriptive approach was used for present study. The collected data were analysed using simple percentage analysis, average of rankings, standard deviation, t- test and chi- square analysis

Potential areas/districts of Andhra Pradesh were selected and potential villages were selected from those districts. Selected areas/districts of Andhra Pradesh are:

Table 2: Area/Districts and Villages Covered for the Study

S. No.	Area/District	Villages	Farmers
1	Macherla & Guntur	8 Villages	36 Farmers
2	Khammam	4 Villages	20 Farmers
3	Mahbubabad & Warangal	6 Villages	24 Farmers
4	Ranga Reddy	3 Villages	17 Farmers
5	Adoni (Kurnool)	6 Villages	30 Farmers
6	Gadwal (Mahabubnagar)	4 Villages	22 Farmers

Sampling Technique

For farmers first judgemental sampling was done to select potential Chilly growing areas and villages of Andhra Pradesh and then convenient sampling was done to select farmers in the villages. For dealers judgemental sampling was done to select dealers who are having dealership of the major companies of pesticides. The study was conducted on two types of the sample units i. e., farmers and dealers/retailers. The size of each sample unit is given in the table 3.

Table 3: Sample Units and Sample Size

S. No.	Sample	Size
1	Farmers	150
2	Dealers/Retailers	50
	Total	200

RESULTS AND DISCUSSIONS

After the collection of data, tabulation was done and then using appropriate statistical techniques, results were explained. The results and findings in detail are presented below:

Area Wise Chilly Growing Pattern

This pattern shows that in Guntur region farmers grows both local varieties and hybrids and they are adopting both direct sowing and transplanting.

Table 4: Area Wise Chilly Growing Pattern

Areas	Sowing Method			Local Varieties or Hybrids		
	Nursery	Direct Sowing	Both	Local Varieties	Hybrids	Both
Guntur	41.67	41.67	16.67	16.67	50	33.33
Macherla	12.5	83.33	4.17	66.67	12.5	20.83
Khammam	100				100	
Mahabubabad and Warangal	100			12.5	83.33	4.17
Ranga Reddy	41.17	58.33			100	
Adoni (Kurnool)	66.67	26.67	6.67	26.67	66.67	6.67
Combined	64	33	3	61	23	16

Distribution of Farmers, According to the Sowing Method and Use of Variety and Hybrid

Out of total 150 farmers 64% were nursery growing. Reason behind adopting direct sowing by the farmers is that, in case of low rain fall crop can be grown but in case of nursery cultivation if rain fall is low transplanting is difficult.

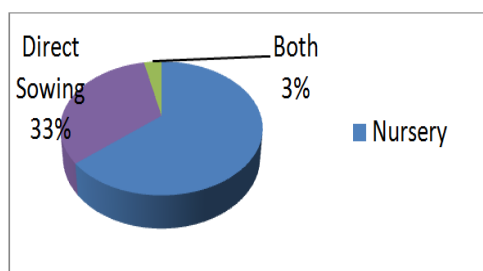


Figure 3: Distribution of Farmers, According to the Sowing Method

Out of total 150 farmers 61% farmers were growing hybrids. The average yield in case of hybrid was found more compare to the variety

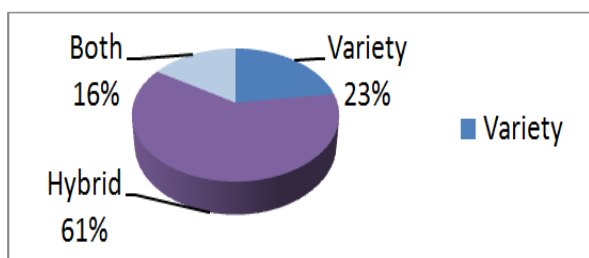


Figure 4: Distribution of Farmers, According to Use of Variety or Hybrid

Table 5: Average Yield of Variety and Hybrid By Individual Sample t-test

Group Statistics				
Variety/Hybrid	N	Mean	Std. Deviation	Std. Error Mean
Yield 1.00	34	24.5588	2.65366	0.45510
2.00	91	31.5714	3.17330	0.33265

This statistics shows that the average yield of variety is found to be 24.56 quintals/acre and average yield of hybrid is found to be 31.57 quintals/acre. T-test value was also found significant to the mean of this statistics. Similarly study about adoption was also conducted by **Sengupta** (1967) and study for price of hybrids in capsicum was studied by **Stoffella and Bryan** (1988).

Farmers' Perception of Different Diseases

In Chilly diseases and their local names and time of appearance are given in below table:

Table 6: Diseases, their Local Names and Time of Occurrence

Disease	Local Name	Time of Occurrence
Cercospora Leaf Spots	Aagu Macha Tegulu	30-35 DAS & 70-90 DAS
Alternaria/Die Back/Fruit Rot	Comma Endu Tegulu/Kayakuludu	100 DAS & 130 DAS
Powdery Mildew	Bhudida Tegulu	60-90 DAS
Bacterial Leaf Spots	Kommendu	90-110 DAS (Dec.-Jan)
Root Wilt/Wilt	Vairu Kuludu/Endi Powadum	Nursery/100 DAS

In Andhra Pradesh, area wise disease severity changes due to the climatic conditions of and also their sowing time. Area wise disease severity is shown in the table below:

Table 7: Area Wise Diseases and their Severity

Areas	Highly Severe	Moderately Severe	Less Severe
Guntur, Macherla & Khammam	Cercospora Leaf spots & Anthracnose/Die back	Choenophora & Powdery Mildew	Wilt (During heavy rains)
Mahabubabad & Warangal	Cercospora and other Leaf spots , Anthracnose/Die back & Choenophora	Powdery Mildew	Wilt (During heavy rains)
Ranga Reddy	Cercospora, Bacterial Leaf spots & Choenophora	Powdery Mildew & Anthracnose	Wilt (During heavy rains more)
Adoni & Mahabubnagar	Powdery Mildew	Anthracnose/Die back, Leaf spots & Root Wilt	Choenophora

This table shows the area wise disease severity. Areas which are having same disease pattern are grouped in the same category. Disease pattern is affected by the climate and rainfall pattern of the areas. In Guntur, Macherla, Adoni, Mahabubnagar, Warangal and some areas of Khammam viral attack was more in 2011 due to low rain fall. Due to viral attack in some areas, yield reduced very much even up to 60-70% and farmers got even 7-10 quintals/acre.

Area Wise Farmers' Expenses on Fungicides

It has found that in Guntur and Adoni farmers are spending more amount of fungicides compared to other regions. Guntur is having a very high production of Chilly and farmers are more aware about fungicides as compared to other areas. In Adoni farmers' shifted from Guntur are living so they are following the same practices as of Guntur, so this pattern is same in both areas. In Ranga Reddy and some part of Warangal Chilly is grown for vegetable purpose also. In Ranga Reddy farmers are doing less expenditure on fungicides compared to all other areas. (Table 8)

Table 8: Area Wise Farmers' Expenses on Fungicides and No. of Sprays of Fungicides

Areas	Expenses on Fungicides (Per acre)	No. of sprays of fungicides (per acre)
Guntur & Adoni	Rs. 12,000-15,000/-	15-20 Sprays
Macherla, Khammam, Mahabubabad & Mahabubnagar	Rs. 8,000-10,000/-	12-15 Sprays 10-12 Sprays (Mahabubabad)
Warangal	Rs. 10,000-12,000/-	12-15 Sprays
RangaReddy	Rs. 7,000-8,000/-	10-12 Sprays

The Current Fungicide Consumption Pattern in the Chilly Crop in Andhra Pradesh

In his objective area wise and disease wise distribution of the farmers using different fungicides is done. Chemicals which are having more movement are identified in this regard. Pesticide consumption pattern in Chilly was also studied by Singh (2003).

Distribution of Farmers, According to the Use of Fungicides for Cercospora Leaf Spots

This table shows that M-45 and Avatar are having a good response to Cercospora disease, but Companion is having a poor response compared to SAAF of UPL. Bavistin of BASF is also having good response in this disease.

Table 9: Distribution of Farmers' According to Fungicides Used for Cercospora Leaf Spots

(values in %)								
S. No.	Fungicides for Leaf Spots	Guntur	Macherla	Khammam	Warangal	Ranga Reddy	Adoni (Kurnool)	Mahabub Nagar
1	M-45	91.67	83.33	95.00	91.67	94.12	80.00	95.45
2	Companion	33.33	25.00	50.00	33.33	29.41	26.67	40.91
3	SAAF	66.67	50.00	65.00	66.67	58.82	56.67	59.09
4	Amister	66.67	66.67	20.00	4.17	0.00	13.33	9.09
5	Contaf	50.00	54.17	20.00	20.83	58.82	46.67	45.45
6	Taquat	0.00	0.00	50.00	33.33	5.88	30.00	0.00
7	Nativo	0.00	50.00	25.00	29.17	11.76	20.00	4.55
8	Bavistin	91.67	41.67	85.00	79.17	70.59	66.67	81.82
9	Z-78	66.67	29.17	60.00	45.83	29.41	56.67	50.00
10	Sprint	66.67	37.50	35.00	12.50	64.71	10.00	9.09
11	Avatar	83.33	95.83	80.00	95.83	91.67	93.33	94.52
12	Antracol	33.33	41.67	15.00	54.17	17.65	30.00	54.55

Distribution of Farmers, According to the Use of Fungicides for Anthracnose/Die Back/Fruit Rot

It has found that in case of Anthracnose/die back Cabritop of BASF and Amister of Syngenta are having a very good response in all the areas. COC and other molecules are having less response compare to these two molecules.

Table 10: Distribution of Farmers, According to Fungicides Used for Anthracnose/Die Back/Fruit Rot

(values in %)

S. No.	Fungicides for Anthracnose	Guntur	Macherla	Khammam	Warangal	Ranga Reddy	Adoni (Kurnool)	Mahabub Nagar
1	MATCO	41.67	20.83	50.00	29.17	11.76	33.33	27.27
2	Trucop	33.33	25.00	25.00	25.00	11.76	26.67	27.27
3	Blue Copper	25.00	45.83	45.00	25.00	41.18	43.33	31.82
4	Blitox	25.00	16.67	45.00	37.50	41.18	26.67	36.36
5	Ridomil	16.67	20.83	45.00	25.00	47.06	56.67	45.45
6	Cabrio Top	95.54	70.83	60.00	70.83	70.59	63.33	54.55
7	Merger	83.33	37.50	30.00	37.50	35.29	23.33	13.64
8	Amister	91.67	95.54	50.00	62.50	88.24	90.00	86.36

Distribution of Farmers, According to the Use of Fungicides for Powdery Mildew

In case of Powdery Mildew Adoni and Mahabubnagar areas having high severity, so the chemical movement of this disease is more when compared to other areas. In Khammam region Karathane of Dow Agro and Index of NACL are having a good response compared to BOON of Indofil. In areas where this disease is severe field development activities of other companies are also more compared to Indofil. In all the areas Avatar is having, from moderate to good response.

Table 11: Distribution of Farmers, According to the Use of Fungicides for Powdery Mildew

(values in %)

S. No.	Fungicides for Powdery Mildew	Guntur	Macherla	Khammam	Warangal	Ranga Reddy	Adoni (Kurnool)	Mahabub Nagar
1	Boon	25.00	50.00	40.00	58.33	29.41	46.67	50.00
2	Index	58.33	16.67	75.00	58.33	5.88	46.67	68.18
3	Karathane	8.33	33.33	55.00	29.17	58.82	26.67	9.09
4	Bayleton	33.33	4.17	10.00	20.83	64.71	50.00	77.27
5	Nativo	33.33	70.83	25.00	33.33	5.88	60.00	59.09
6	Folicure	50.00	37.50	0.00	12.50	5.88	3.33	0.00
7	Avatar	75.00	87.50	55.00	50.00	70.59	76.67	54.55

Distribution of Farmers, According to the Use of Fungicides for Wilt

In case of wilt, Root wilt is also a problem. For this soil drenching of Trichoderma is done. Farmers use MATCO and Ridomil as drenching and for spraying purposes. Cu fungicides are also used for wilt. Cu fungicide of other companies like Blue copper and Blitox is having better response than Trucop of Indofil.

Table 12: Distribution of Farmers, According to the Use of Fungicides for Wilt

(values in %)

S. No.	Fungicides for Wilt	Guntur	Macherla	Khammam	Warangal	Ranga Reddy	Adoni (Kurnool)	Mahabub Nagar
1	Trichoderma Viridae	41.67	58.33	75.00	54.17	35.29	60.00	77.27
2	MATCO	25.00	33.33	40.00	37.50	17.65	33.33	31.82
3	Ridomil	25.00	66.67	35.00	58.33	64.71	76.67	63.64
4	Blitox	8.33	54.17	45.00	33.33	35.29	30.00	40.91
5	Blue Copper	0.00	25.00	15.00	62.50	58.82	63.33	40.91
6	Trucop	0.00	16.67	15.00	20.83	5.88	20.00	27.27

Distribution of Farmers, According to the Use of Fungicides for Choenophora Blight

In case of Choenophora blight response of Avatar is good. Other chemicals Cabritop and Amister are also having good responses. In Guntur response to the chemicals of this disease are good.

Table 13: Distribution of Farmers, According to the Use of Fungicides for Choenophora Blight

(values in %)

S. No.	Fungicides for Choenophora Blight	Guntur	Macherla	Khammam	Warangal	Ranga Reddy	Adoni (Kurnool)	Mahabub Nagar
1	Avatar	91.67	83.33	80.00	83.33	88.24	80.00	86.36
2	Trucop	33.33	25.00	20.00	20.83	17.65	26.67	31.82
3	Amister	66.67	79.17	45.00	37.50	64.71	80.00	72.73
4	Cabrio Top	66.67	62.50	75.00	75.00	82.35	53.33	45.45
5	Blue Copper	41.67	25.00	10.00	58.33	41.18	46.67	31.82
6	Blitox	25.00	58.33	45.00	33.33	41.18	40.00	36.36

Distribution of Farmers, According to the Use of Fungicides for Bacterial Leaf Spots

It is used by mixing with other chemicals like SAAF, Companion. Bactrinashak and Plantomycin are having a good response in all the areas.

Table 14: Distribution of Farmers, According to the Use of Fungicides for Bacterial Leaf Spots

S. No.	Fungicides for Bacterial Leaf spots	Guntur	Macherla	Khammam	Warangal	Ranga Reddy	Adoni (Kurnool)	Mahabub Nagar
1	Streptocycline	66.67	37.50	75.00	75.00	41.18	40.00	50.00
2	Plantomycin	41.67	58.33	75.00	75.00	58.82	70.00	63.64
3	Bactrinashak	66.67	75.00	60.00	50.00	70.59	66.67	59.09
4	Crypto	8.33	0.00	0.00	0.00	0.00	0.00	0.00
5	Biozyme	16.67	0.00	0.00	0.00	0.00	0.00	0.00

Other Fungicides Used

In Adoni, Mirador (Makhtesim), Cu domark (IS-Agro), Cocide (Du Pont) are used. In some areas Cuman-L, Ergon, Kavach, Benofit (Coromandal) are also used.

Farmers spray chemicals in 7-10 days interval and type of chemical to be used may vary according to climatic condition and its severity. Like wilt is severe if there is heavy rain so farmers spray more chemicals for controlling wilt and in case of more temperature decline chances of Powdery mildew are more so farmers use chemicals to control it more frequently. If an attack of Anthracnose is more then there are more chances of occurrence Fruit rot or die back so the number of sprays of Cabritop will be more in this case. So this shows the pattern of fungicide use by Chilly growers in different climatic conditions. Similarly, adoption and marketing behaviour of Chilly growers in Guntur district was also studied by Venkataramalu (2003).

CONCLUSIONS

From this study it can be concluded that Red chilly is a very important crop for farmers of Andhra Pradesh and Telangana. Control of diseases is very much essential for this crop to gain good yield and quality produce, but as per varied climatic conditions severity of diseases in different districts is different. So, control measures adopted and expenses done

for this need to be understood as per disease pattern in districts. Accordingly farmers can be suggested for identifying diseases as per severity and control measures for them.

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